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**APPLICATION
FOR
UNITED STATES
LETTERS PATENT**

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FOR: **METHOD AND MOBILE TERMINAL
FOR KEEPING INCOME AND
EXPENSE**

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1 TITLE OF THE INVENTION

2 **Method and Mobile Terminal for Keeping Income and Expense**

3 BACKGROUND OF THE INVENTION

4 Field of the Invention

5 The present invention relates generally to electronic commerce and
6 more specifically to a method and mobile terminal for keeping income and
7 expense through a communications network such as the Internet.

8 Description of the Related Art

9 Keeping amounts of income and expense for precision analysis for
10 home economy requires constant monitoring on incomes and withdrawals
11 automatically performed on one's bank savings account as well as on the
12 amount of cash paid for daily purchases. Although accounting software is
13 currently available, manual input of the receipt data of the purchases into the
14 user's computer is a cumbersome and time-consuming task, and inevitably
15 entails human errors. Access to the homepage of user's bank for enquiry for
16 income and expense also needs manual transfer to an account book.

17 Japanese Patent Publication 8-161269 discloses an electronic household
18 account book. Although the known account book is a handheld device, the
19 known device is not designed for operation with a communications network.
20 Hence, input data must be manually entered through a keypad.

21 Therefore, there exists a need for a method and device for receiving
22 monetary data from the network without human intervention.

23 SUMMARY OF THE INVENTION

24 It is therefore an object of the present invention to provide a method
25 and mobile terminal for keeping income and expense of a person

1 substantially without human intervention.

2 According to a first aspect of the present invention, there is provided a
3 method of keeping income and expense of a person in a mobile terminal
4 having a savings memory. The method comprises the steps of storing, in the
5 savings memory, an amount currently saved in a bank's savings account of
6 the person, receiving from the bank an e-mail identifying a withdrawal
7 source and indicating an amount withdrawn from the savings account, and
8 updating the savings memory with the amount indicated in the e-mail.

9 Preferably, the mobile terminal further includes an expected expense
10 memory and an expense record memory. The method further comprises the
11 steps of receiving from one of a plurality of withdrawal sources, an e-mail
12 indicating an expected amount to be withdrawn from the savings account,
13 storing the expected amount in the expected expense memory, and
14 transferring from the expected expense memory an amount equal to the
15 amount indicated in the e-mail received from the bank to the expense record
16 memory.

17 According to a second aspect, the present invention provides a mobile
18 terminal comprising a wireless interface for establishing a communication
19 link through a communications network to income and withdrawal sources, a
20 savings memory for storing an amount currently saved in a bank savings
21 account of an owner of the mobile terminal, and control circuitry connected
22 to the interface for receiving an e-mail which identifies a withdrawal source
23 and indicates an amount withdrawn from the savings account, and updating
24 the savings memory with the indicated amount.

25 Preferably, the mobile terminal further includes an expected expense

1 memory and an expense record memory. The control circuitry receives from
2 one of a plurality of withdrawal sources an e-mail indicating an expected
3 amount of payment to be withdrawn from the bank savings account of the
4 owner, stores the indicated amount of payment in the expected expense
5 memory, and transfers from the expected expense memory an amount equal
6 to the amount indicated in the e-mail received from the bank to the expense
7 record memory.

8 BRIEF DESCRIPTION OF THE DRAWINGS

9 The present invention will be described in detail further with reference
10 to the following drawings, in which:

11 Fig. 1 is a block diagram of a hand-held mobile terminal connected to a
12 communications network for receiving income and expense data from a
13 number of income and withdrawal sources and settling household or
14 personal accounts;

15 Figs. 2A, 2B, 2C and 2D are flowcharts of the operation of the mobile
16 terminal; and

17 Fig. 3 shows routines performed by the accounting module based on
18 data stored in memories of the mobile terminal.

19 DETAILED DESCRIPTION

20 Referring to Fig. 1, an electronic mobile accounting system of the
21 present invention is illustrated. The system is comprised of a user's mobile
22 terminal 1 and a communications network 2. A base station transceiver 3 of a
23 cellular mobile network forms part of the communications network 2.

24 To the communications network 2 are connected a plurality of
25 computers, including a computer 4 of a bank in which the user's savings

1 account is maintained, a computer 5 of user's income source such as the
2 user's employer or a company of which the user is a stockholder. Income
3 source 5 is connected through the network 2 to the bank's computer 4 to pay
4 salary or dividend into the user's bank account. A withdrawal source 6,
5 which is a computer of such organizations as public utilities (gas, water,
6 electricity and telephones), insurance or loan/credit company, is also
7 connected to the network. If the withdrawal source is a loan/credit
8 company, it receives signals from a cashless sales terminal 7 and sends a
9 statement of withdrawal for a purchase or a borrowing with an e-mail. If the
10 mobile terminal uses an infrared-light communication to access the cashless
11 sales terminal, the withdrawal source 6 sends the statement to the user
12 through the same means of communication. A cash sales terminal 8 is also
13 connected to the network 2 to issue a "receipt" by sending an e-mail to the
14 mobile terminal 1. If sales terminals 7 and 8 are provided with an infrared
15 light transceiver, they establish communication with the user through an
16 infrared light transceiver 20 of the mobile terminal.

17 Mobile terminal 1 includes a number of memories whose read/write
18 operations are under the control of a CPU 18. These memories are classified
19 into fund memories, expected accounts memories and record memories. The
20 fund memories include a savings memory 11 and a cash memory 12 for
21 storing a user's bank savings and a current amount of user's cash,
22 respectively. The expected accounts memories include an expected income
23 memory 13, an expected variable expense memory 14 and an expected fixed
24 expense memory 15. Expected income memory 13 is used to store an
25 expected amount of income such as payment for work and dividend

1 deposited into the user's bank account. Expected variable expense memory
2 14 stores an expected but unpredictable amounts of expenses such as
3 payments for bills from the public utilities, and the expected fixed expense
4 memory 15 stores an expected fixed amounts of expenses such as fees for
5 subscribed periodicals. The record memories include an income record
6 memory 16 and an expense record memory 17 for maintaining past records of
7 incomes and expenses, respectively.

8 Control unit 18 is responsive to signals received by a wireless
9 transceiver 19 from the communications network 2 or signals received by the
10 infrared light transceiver 20 from the sales terminal 7 or 8. A keypad 21 is
11 used to enter user's data into memories 11 and 12.

12 A data analyzer 22 is used to provide settlement of accounts by using
13 data stored in memories 11 to 17 in a manner as will be described. Data
14 entered through the keypad 21 or data obtained by the data analyzer 22 are
15 displayed on a display panel 23.

16 A personal computer 24 may be coupled to the hand-held mobile
17 terminal 1 as a back-up device or as a terminal for accessing an accounting
18 web site 25 through the network 2.

19 The operation of the control unit 18 proceeds as shown in the
20 flowcharts of Figs. 2A to 2D.

21 At the beginning of the operation (step A1), the user manipulates the
22 keypad 21 to initialize the cash memory 12 with the amount of cash he is
23 currently in possession, the memory 14 with expected variable expenses
24 (such as utilities fees) according to items and due dates, and the memory 15
25 with expected fixed expenses (such as payments for subscribed periodicals

1 and housing loan) according to items, fees and due dates.

2 Mobile terminal 1 requests a statement of his savings account from the
3 bank by sending an e-mail 30 from the wireless transceiver 19, which is
4 routed through the network 2 to the bank's computer 4 (step A2). In
5 response, the bank's computer 4 returns the requested savings account
6 statement to the user with an e-mail 31, which is routed through the network
7 to the mobile terminal 1 (step A3).

8 Mobile terminal 1 responds to the e-mail 31 from the bank's computer
9 by initializing its savings memory 11 with the amount currently saved in the
10 user's bank account (step A4).

11 When the income source 5 pays the user's salary or dividend into the
12 user's bank account as indicated by a dotted line 32 in Fig. 1 (step A5), an e-
13 mail 33 is transmitted from the bank computer 4 to the user, indicating the
14 amount paid from the income source 5 to the user's bank account (step A6).
15 Mobile terminal 1 updates the savings memory 11 with the income data from
16 the bank (step A7).

17 In response to the communication from the bank, the mobile terminal
18 requests a statement of payments from the income source 5 by sending an e-
19 mail 34 through the network (step A8). Income source 5 returns the
20 requested statement with an e-mail 35 (step A9).

21 At step A10, the mobile terminal 1 examines the contents of the e-mail
22 35 and stores deducted amounts into the expense record memory 17 and non-
23 deducted amounts into the income record memory 16.

24 If the withdrawal source 6 receives a communication 36 from the
25 cashless sales terminal 7 indicating that a user's purchase or a burrowing

1 occurs, it sends a statement of expected withdrawal from the user's bank
2 account to the mobile unit 1 with an e-mail 37. If infra-red light is used
3 between the mobile terminal 1 and the cashless sales terminal 7 for
4 transactions, the withdrawal source 6 sends the statement of withdrawal to
5 the cashless sales terminal 7 by a communication 38. In response, the sales
6 terminal 7 retransmits the received statement to the mobile terminal over an
7 infrared-light path 39. In addition, the e-mail 37 is also transmitted from the
8 withdrawal source 6 when the public utilities companies periodically issue a
9 statement of expected withdrawal from the user's bank account.

10 If the mobile terminal 1 receives the statement of withdrawal by the e-
11 mail 37 or through the infrared-light path 39 (step A11), it stores the received
12 withdrawal data into the expected variable expense memory 14 (step A12).

13 When the due date of a user's unsettled payment arrives the
14 withdrawal sources 6 withdraws that payment from the user's savings
15 account as indicated by a dotted line 40. When this occurs, the bank
16 computer 4 informs the user of the settled payment withdrawn from his bank
17 account by sending an e-mail 41 through the network to the mobile terminal 1
18 (step A13). A withdrawal notification e-mail 41 is also transmitted from the
19 bank computer 4 when the user himself makes a withdrawal from his bank
20 savings account.

21 Mobile terminal 1 responds to the e-mail 41 by updating its savings
22 memory 11 with the amount indicated in the received e-mail (step A14).
23 Thus, a payment settled in the user's bank savings account is also settled in
24 the savings memory 11 and there is an exact match between the savings
25 memory 11 and the user's bank savings account.

1 Mobile terminal 1 analyzes the contents of the withdrawal source
2 indicated in the received e-mail 41 and determines whether the withdrawal
3 notification is due to his own withdrawal from his bank savings account (step
4 A15). If so, the mobile terminal proceeds to step A19 to update the cash
5 memory 12 by adding the amount indicated in the e-mail 41.

6 If the withdrawal source identified by the e-mail 41 is other than the
7 user (owner) of the mobile terminal, the mobile terminal determines that the
8 withdrawal is due to the settlement of some utility or loan/ credit bill and
9 flow proceeds from step A15 to step A16 for making comparisons between
10 the contents of the e-mail 41 and the contents of memories 14 and 15 for a
11 match. If the item, the amount withdrawn and the due date indicated in the
12 received e-mail 41 coincide with those in one of the entries of these memories
13 (step A17), the matched entry is cancelled in that memory and transferred to
14 the expense record memory 17 (step A18).

15 In Fig. 2D, if the user makes a purchase with the cash sales terminal 8,
16 the latter sends a receipt of the purchase to the user with an e-mail 42 if
17 infrared-light communication means are not available. If the infrared-light
18 interface is provided in the cash sales terminal 8, the receipt is sent via an
19 infrared-light path 43 to the mobile terminal (step A20). The transmitted
20 receipt indicates the amount paid for the purchase and identifies the
21 purchased item.

22 In response to the receipt of the purchase from the sales terminal 8, the
23 mobile terminal proceeds to step A21 to update the cash memory by
24 subtracting the amount indicated in the receipt from the stored current value.
25 Mobile terminal 1 then executes steps A22 to A24 which correspond in

1 significance to steps A16 to A18 of Fig. 2C.

2 Preferably, the e-mail received from the network 2 is written in a data
3 format that can be treated as a visual text for display as well as in a data
4 format that can be read into an accounting software program. The data read
5 into the accounting software program should include an amount, type
6 (income or expense) and date of transaction.

7 It is seen from the foregoing that wherever the user goes carrying the
8 mobile terminal of the present invention, he is able to ascertain the contents
9 of his savings account and the amount of cash in current possession and
10 updates its savings and cash memories at all times. Further, the storage of
11 expected withdrawals in the expected expense memories 14 and 15 allows the
12 user to make an accurate plan for future allowable expenses when a
13 withdrawal occurs. In addition, the deducted amounts stored in the expense
14 record memory 17 serves to contrast the amount of income stored in the
15 savings memory 11.

16 Data analyzer 22 uses data stored in the memories 11 to 17 to perform
17 a number of routines as illustrated in Fig. 3.
18 In routine B1, the data analyzer 22 sorts data stored in the income and
19 expense record memories 16 and 17 according to items and settles accounts of
20 previous month. In routine B2, the data analyzer 22 sorts data stored in the
21 memories 13, 14, 15, 16 and 17 according to items and calculates expected
22 balances and counts for current month. In routine B3, the data analyzer 22
23 sorts data stored in the memories 13, 14 and 15 and calculates expected
24 accounts of next month. In routine B4, the data analyzer 22 uses data stored
25 in the memories 13, 14, 15, 16 and 17 to calculate estimated balances and

1 accounts and determines both expected and paid expenses of current month.
2 In routine B5, the record memory 16 is used to calculate average, maximum
3 and minimum values of past income data, and an expected income of next
4 month is estimated. In routine B6, data stored in the memories 16 and 17 of
5 the previous month are compared with each other, and increases and
6 decreases with respect to past average values are calculated as an evaluation
7 of expenses.

8 In routine B7, a simulation of expenses is provided. In this routine,
9 data in memories 13 to 17 are referenced and expected expenses of next and
10 subsequent months are sorted according to different items and future income
11 and expense and an amount saved in the users' bank savings account are
12 estimated.

13 In routine B8, a simulation of savings amount is performed by
14 referencing all memories 11 to 17. Based on the income and expense data,
15 expenses expected for the next and subsequent months and an expected
16 savings amount that can be achieved are determined.

17 Data stored in the mobile terminal 1 may be copied and downloaded
18 to the personal computer 24 as a precaution against possible loss of data from
19 the mobile terminal. Using the computer's keyboard, the user can edit the
20 downloaded data. In addition, the user can make the most of the computing
21 power of the personal computer 24 for making an accurate analysis of the
22 downloaded data. To this end, the computer 24 establishes a connection to
23 the web site 25 through the network, where the data is analyzed by expertise
24 and the results of analysis are sent to the computer 24.

25 Based on the analysis by experts, the computer 24 may issue a warning

